Connecticut Health care Workforce Scan

A report prepared by:

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6/28/2013

Introduction

The State of Connecticut is one of sixteen states with a State Innovation Model Design Grant awarded by the Centers for Medicare and Medicaid Services (CMS) to create a State Health Care Innovation Plan. The Connecticut Department of Social Services (DSS) received the award to design a transformed health care payment and delivery system for the state. A desired element for the Connecticut plan involves expansion of primary care through contracting and payment strategies across multiple payers. An expanded supply of primary care physicians and other health care professionals is also desired.[1] Understanding the current state of Connecticut's health care workforce is an important step in the creation of the State Health Care Innovation Plan.

The Center for Public Health and Health Policy (CPHHP) at the University of Connecticut Health Center agreed to conduct a scan of Connecticut's health care workforce. The scan sought to identify the number and types of health care providers, where they are located, and any relevant descriptive information about them that is available (e.g., age, race and ethnicity, gender, practice environment). Health professions initially selected in the scope of work for this scan included: physicians, physician assistants, nurses, dentists, pharmacists, and licensed social workers. The expanded list of health professionals included in this scan are shown in Table 1.

Table 1: Health Professionals included in Scan of Connecticut's Workforce Supply.

Primary Care Physicians	PCP Extenders	Behavioral Health Practitioners	Other Providers
• General • Family • Internal Medicine • OBGYN • Pediatrics	• Nurse Practitioner • Physician Assistant • Nurses • Medical Assistant	• Psychiatrist • Psychologist • Mental Health Counselor • Drug and Alcohol Recovery Counselor	• Pharmacists • Dentists

This report describes available data on the health care industry workforce, exploring office size, staffing and location (Section A), the supply of practicing primary care physicians (Section B) and other health professionals (Section C), and health workforce demographics, including age, race and gender (Section D). Each section provides an overview of the findings, data sources, and limitations of the data presented.

The approach for this scan relied heavily upon an extensive search for existing data and reports through web-based inquiries, academic literature review, and a query of related professional organizations in the state. Approximately thirty documents relevant to the health care workforce in Connecticut were identified during the course of the project. In addition, a number of data sources maintained by the state and federal government were also identified. Due to the short timeline for this project, no primary data from

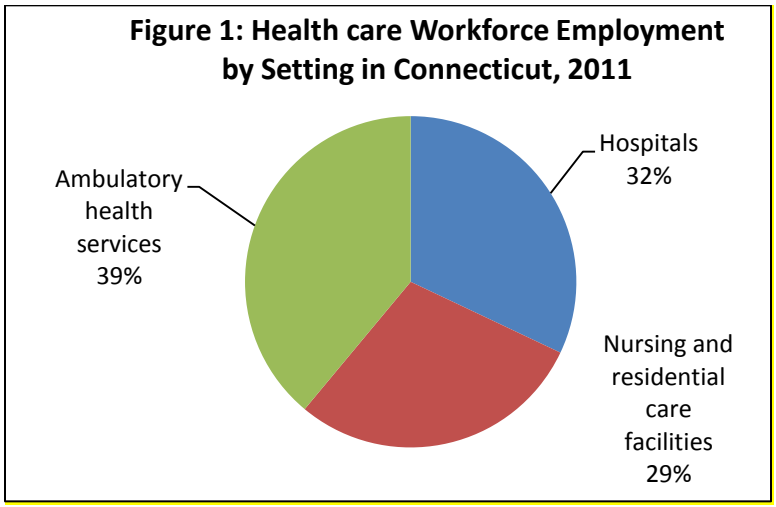
[1] SIM Model Design Grant Application Materials, accessed: http://www.healthreform.ct.gov/ohri/cwp/view.asp?a=2742&q=334890.

providers was collected. Instead, the report relies on data either captured in existing reports or readily available from state or national data sources.

Section A: Connecticut Health care Industry Workforce.

This section describes the supply of physicians' offices in Connecticut using two sources, 1) the County Business Patterns data maintained by the U.S. Census Bureau and 2) health care industry data maintained by the private firm SK&A.

Findings. In 2011, Connecticut's health care industry employed 219,725 health professionals and support staff. Of people employed in health care, 39% worked in ambulatory health services, 32% in hospitals and 29% in nursing and residential care facilities (Figure 1).[2] Recent years have shown substantial job growth in the nursing and residential care facilities and continued growth is anticipated given demographic shifts toward an aging population.[3]



Source: US Census County Business Patterns

Ambulatory Care Settings Understanding the workforce employed in the ambulatory care setting has pertinence to the emphasis on primary care within health care reform efforts related to the SIM design plan and the Affordable Care Act. Closely aligned to primary care, ambulatory care includes health care delivered in physicians' offices, dentists' offices, other health practitioners' offices[4], outpatient centers, medical and diagnostic laboratories, home health services, and other ambulatory care services.[5] This section describes characteristics of the ambulatory care sector overall and specifically for physicians' offices and outpatient care centers.

[2] The industry classifications "ambulatory health services," "hospitals," and "nursing and residential facilities" are based on the 2007 North American Industry Classification system (NAICS), further information of which is available here: http://www.census.gov/eos/www/naics/.
[3] State of Connecticut Occupational Projections 2010-2020, Connecticut Department of Labor, available at: http://www1.ctdol.state.ct.us/lmi/projections.asp.
[4] "Other practitioners' offices includes chiropractic, optometrist, mental health practitioners, physical therapy, occupational therapy, speech therapy, audiologists, podiatrists, other.
[5] "Other ambulatory care services" includes family planning centers, outpatient mental health and substance abuse centers, and HMO medical centers.

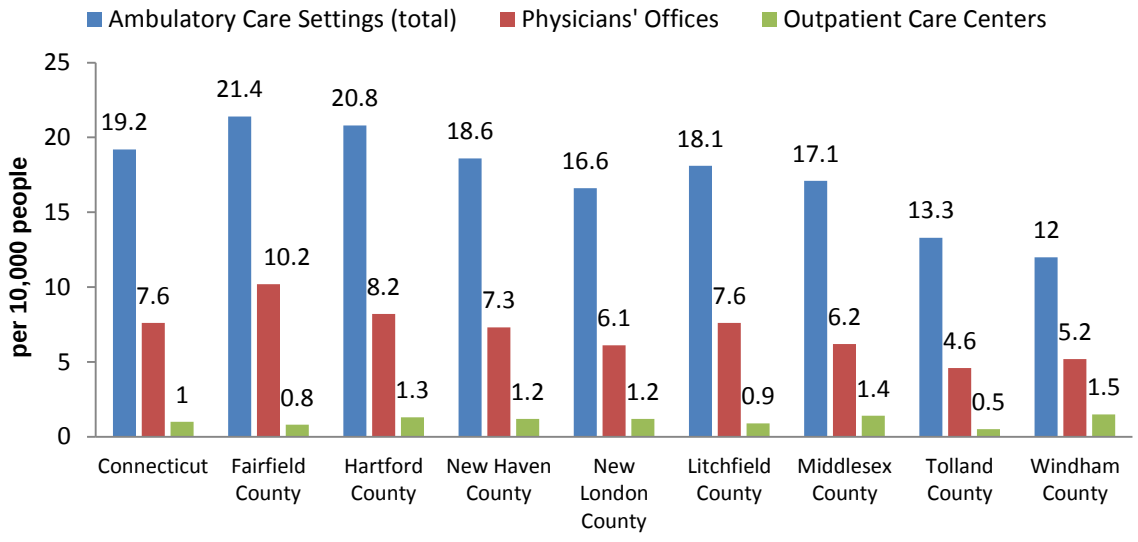
Table 2: Employment in Connecticut's Ambulatory Care Sector, 2011

NAICS	Workforce	Establishments	Ave. # Workers per Establishment
Ambulatory Health care Services (total)	**85,594**	**6,900**	**12.4**
Outpatient Care Centers	9,306 (11%)	362 (5%)	25.7
Physicians' Offices	29,665 (35%)	2,744 (40%)	10.8
Dentists' Offices	12,308 (14%)	1,772 (26%)	7.0
Other Health Practitioners' Offices	9,934 (11%)	1,499 (22%)	6.6
Medical and Diagnostic Laboratories	4,812 (6%)	184 (3%)	26.2
Home Health Services	15,596 (18%)	245 (4%)	63.7
Other Ambulatory Health Services	3,973 (5%)	94 (1%)	42.3

Source: U.S. Census County Business Patterns, 2011

In 2011, 85,594 people worked in Connecticut's ambulatory care settings (Table 2). The 6,900 ambulatory care establishments had an average of 12.4 employees. Employees include both health practitioners and administrative and other staff. Almost half of the ambulatory care employees (46%) worked in outpatient care centers or physicians' offices. Physicians' offices comprised one out of five (21%) of the ambulatory care business establishments and employed more than one-third (35%) of the ambulatory care workforce. Although comprising just 5% of ambulatory care establishments, the state's 362 outpatient care centers employed 11% of the ambulatory care workforce, averaging 26 employees per center.

Figure 2: Ambulatory Care Establishments per 10,000 people by Connecticut County, 2011

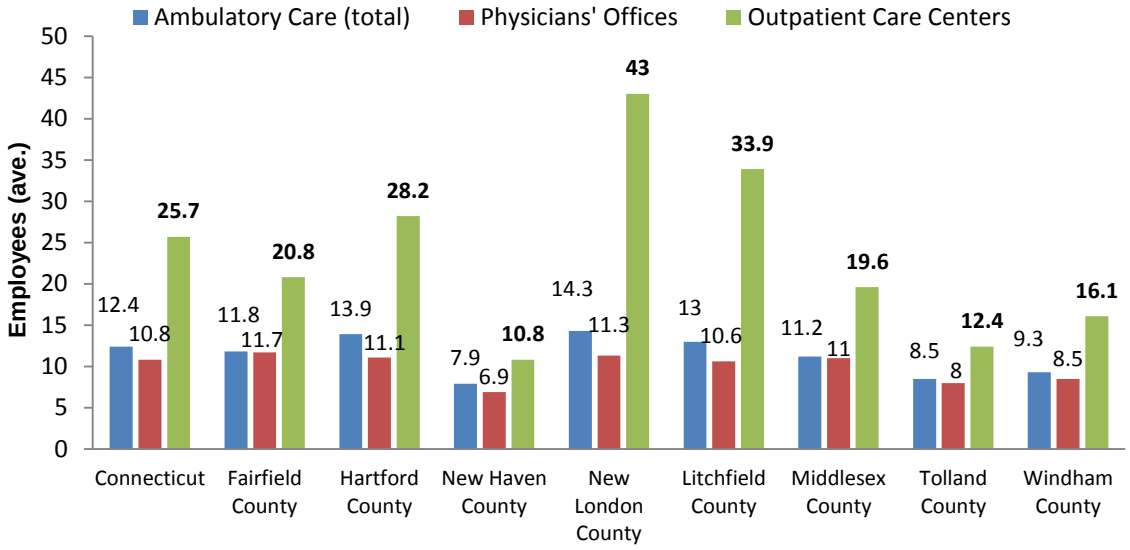


Source: U.S. Census County Business Patterns

Connecticut had approximately 19.2 ambulatory care establishments per 10,000 people (Figure 2). Specifically, there were 7.6 physicians' offices and 1 outpatient care center

per 10,000 people in the state. The counties with the highest density of ambulatory care offices per 10,000 people included Connecticut's three most populated counties, Fairfield County (21.4 offices), Hartford County (20.8 offices) and New Haven County (18.6 offices). Conversely, the counties with the fewest residents, Tolland County and Windham County, had the lowest density of ambulatory care settings (12-13.3 per 10,000 people) and lowest average number of employees (8.5-9.3). Tolland County (4.6) and Windham County (5.2) also had the fewest physicians' offices per 10,000 people.

Figure 3: Average Workforce Size per Ambulatory Care Establishment by County, 2011

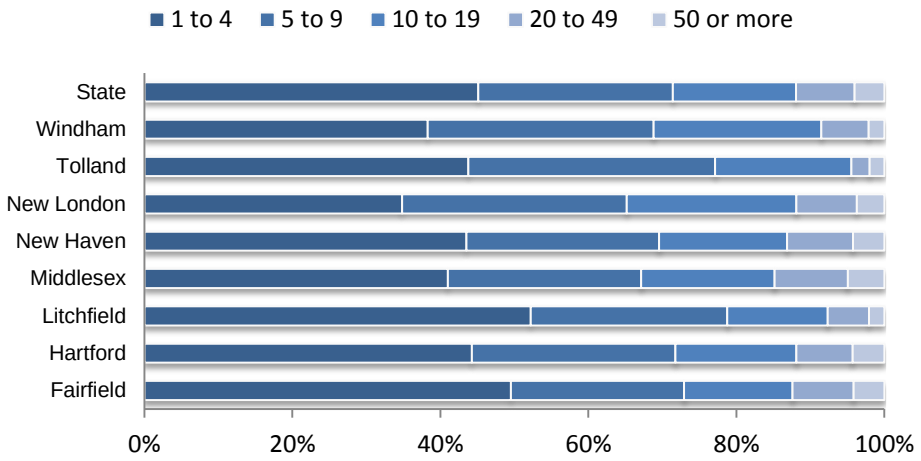


Source: U.S. Census County Business Patterns

Tolland County and Windham County also averaged fewer employees per ambulatory care setting overall and physicians' offices than the state average (Figure 3). This suggests that residents seeking primary care in Tolland and Windham counties may face obstacles. Specifically, Tolland County faced the lowest rate of physicians' offices and outpatient care centers plus staffing levels below the state average.

Establishment by Size of Workforce Ambulatory care establishments averaged 12.4 employees (Figure 3). More than two-thirds of Connecticut's ambulatory care establishments employed fewer than nine employees (Figure 4). Approximately 12% of establishments employed twenty or more employees. Only 4% of ambulatory care establishments employed fifty or more employees.

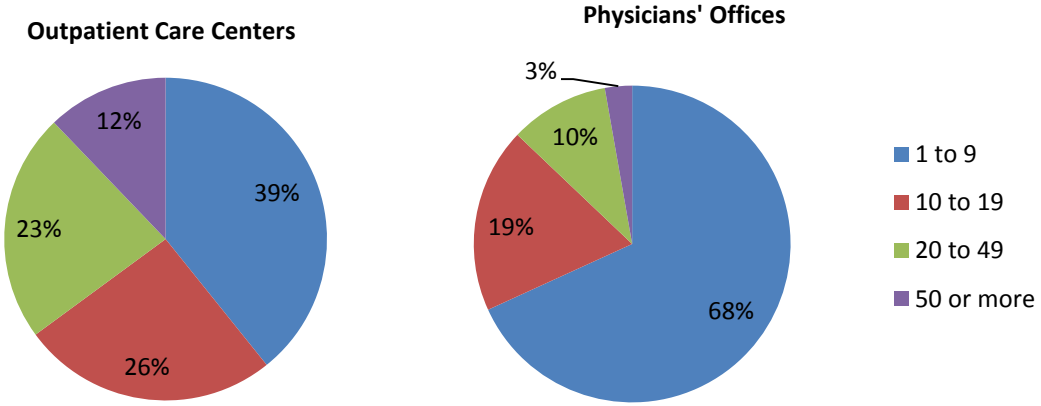
Figure 4: Distribution of Ambulatory Care Establishments in CT by Size of Workforce, 2011



Source: U.S. Census County Business Patterns

The proportion of larger ambulatory care establishments, with 20 or more employees, was greatest in Middlesex County (14.8%) and New Haven County (13.1%). Litchfield County and Tolland County, both rural, had the highest proportion of small establishments (78.8% and 77.1%, respectively) and the lowest proportion of larger ambulatory care establishments (4.5% and 7.7%, respectively). The three rural counties, Litchfield County (2.1%), Tolland County (2.0%) and Windham County (2.1%) ranked lowest for large ambulatory care establishments.[6]

Figure 5: Distribution of Outpatient Care Centers and Physicians' Offices in Connecticut by Staffing Level, 2011



By type of establishment, physicians' offices averaged 10.8 employees each and outpatient care centers averaged 25.7 employees (Figure 3). Figure 5 shows distribution of staffing levels for outpatient care centers and physicians' offices.

[6] The Connecticut Office of Rural Health has identified 65 rural towns in the state, the majority of which are situated within Litchfield, Tolland and Windham counties. See Hold, Wexler and Farnam, LLC, *Rural Community Health in Connecticut: Challenges and Opportunities* (2006) prepared for the Connecticut State Office of Rural Health, available at: http://www.ruralhealthct.org/index.html.

Connecticut physicians' offices tended to be small, with fewer than 10 employees (68%). A minority of physicians' offices, 13%, employed a staff of 20 or more. Conversely, more than a third of outpatient care centers had a staff of 20 or more and fewer than 40% had a small staff of less than ten. (Appendix I: distribution of physicians' offices and outpatient care centers by total employment in CT, county-level)

Change over time. Longitudinal data for 1998 through 2011 is readily available on ambulatory care establishment from the U.S. Census Bureau County Business Patterns. CERC recently conducted an analysis of physicians' offices for 1998-2008. For the ten year period, the report identifies an ebb and flow in the number of physicians' offices, a trend away from smaller offices with 1 to 4 employees (decrease of 210 offices in this size class), a growing workforce, and an increase in the average number of employees per office from 8.5 to 10.4. Despite substantial fluctuations in the number of physicians' offices in some years, the period from 1998 to 2008 ended with a net gain of three offices.[7]

Expanding the analysis to include 1998 to 2011 (Table 3), the number of staff in physicians' offices grew by 6,286 employees and the average number of employees per office increased by 2.36 to 10.8 employees. The number of establishments with 1 to 4 employees fell dramatically by 202 offices. Rather than the small gain in offices observed from 1998 to 2008, extending the time frame to 2011 shows a net loss of 22 offices. If historical fluctuations in offices hold, the sharp decrease in offices may be offset by increases in offices during subsequent years.

Table 3: Change in number and size of physician offices over time, 1998-2011

	State-wide	Fairfield County	Hartford County	Litchfield County	Middlesex County	New Haven County	New London County	Tolland County	Windham County
Physicians' offices	-22	-54	64	6	1	-21	-18	5	-5
Growth in Workforce	6286	2324	2245	163	391	574	447	109	33
Employees per office	2.36	3.41	2.28	0.93	3.80	1.18	3.43	1.08	1.15
Change in Establish-ments with 1 to 4 employees	-202	-74	-13	4	2	-75	-35	-1	-10

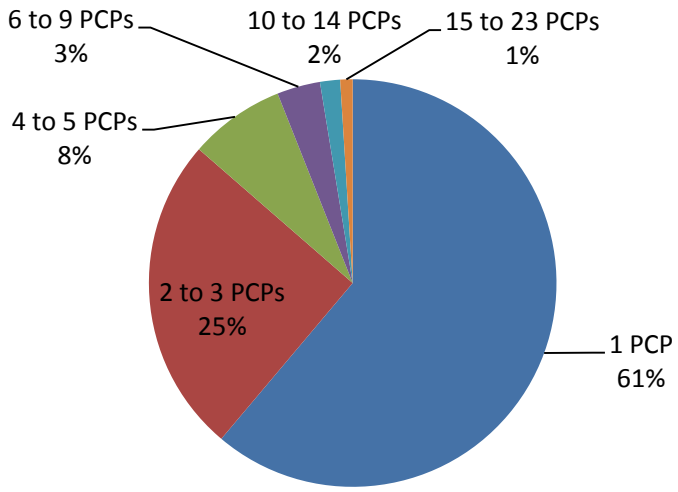
Source: U.S. Census Bureau County Business Patterns

Number of PCPs per Site Health care industry marketing data from SK&A, provided to CPHHP through McKinsey & Co., identifies the number of PCPs per site in Connecticut. The definition of PCP in the SK&A data output from McKinsey & Co., differed from the County Business Patterns. PCPs included family practitioners, general practitioners, internal medicine/pediatrics and internists. Obstetrician-gynecologists did not appear to be included. The data, extracted in 2013 and likely representative of 2012, shows 1,746

[7] Connecticut Economic Resource Center (CERC). Connecticut's Physicians' Contributions to the State's Economy (November 2011). Prepared for the Connecticut State Medical Society.

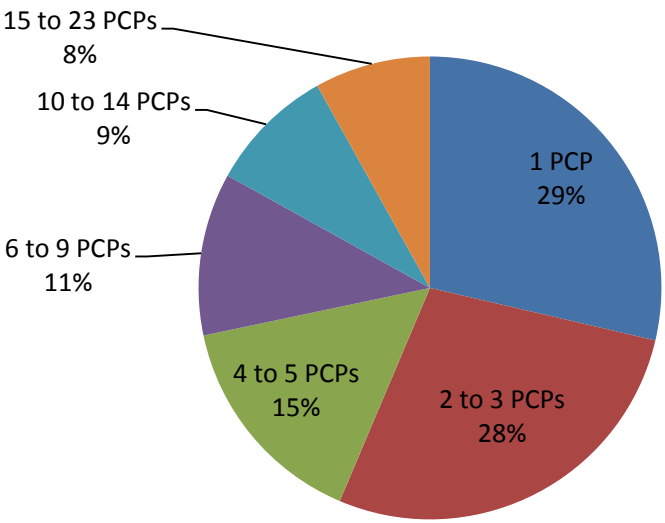
PCPs at 816 sites. The 816 sites identified are not separated by parent company. Therefore, multiple sites may be run by one company and a PCP at one site may also be identified as a PCP for another site.

Figure 6: Proportion of Sites by Number of Primary Care Physicians (PCP) in Connecticut



The number of PCPs per site ranged from 1 to 23, with an average of 2.1 PCPs per site (results not shown). A minority of sites, about 14%, employed more than three PCPs. Only 6% of sites employed more than five physicians (Figure 6). More than half of the sites (61%) employed just one PCP.

Figure 7: Distribution of Primary Care Physicians in Connecticut by Site Size



Of the 1,746 PCPs, 57% worked at small practice sites with three or fewer PCPs (Figure 7). Nearly three out of ten PCPs worked in sites as the sole PCP. Another 17% of the PCPs worked in large practices with 10 or PCPs.

Data Sources and Limitations. The County Business Patterns is publically available information taken from the Business Register, which is maintained by the U.S. Census Bureau. The Business Register consists primarily of IRS data from payroll and other tax records, which are combined with other administrative, Census, and survey data.[8] The information is organized by "establishment." An establishment, as used in the County Business Patterns, is a physical location. A single business entity may operate multiple business establishments. Entities with multiple establishments are referred to as "Multi-Unit Companies." The County Business Patterns excludes data on self-employed individuals, employees of private households, railroad employees, and agricultural production employees. It also excludes data on most governmental employees, although government owned hospital employees are included. Employment data is missing from roughly twelve percent of payroll records; the Census Bureau estimates values for the missing data.[9]

SK&A, a vendor of health care marketing information, maintains health care industry data. Physician Information is collected from medical trade associations, phone books, and medical school alumni directories. Phone verification of the information occurs twice per year. The data is estimated to cover 98.5% of all U.S. physicians. CPHHP received output from a 2013 SK&A data abstract from McKinsey & Co. capturing the number of primary care physicians (PCP) per site in Connecticut.

The County Business Patterns and SK&A data presents a number of challenges when used for workforce estimation. The County Business Patterns include only those establishments that report having paid employees. Sole proprietorship and employees in private homes are not included. While time constraints did not allow for a close examination of Census Bureau's "Non-Employer Statistics" on establishments with no paid employees, a cursory examination revealed that nearly 13,000 non-employer business establishments in Connecticut that provide ambulatory health care services.[10] Although these types of establishments employ relatively few people overall, further analysis of these data may be merited, especially as it pertains to home health care.

In addition, the County Business Patterns may not be appropriate for estimating the total number of individual health care practitioners in a given area. This is because the dataset keeps information on establishments, rather than individuals. It may over-count individuals who work at multiple establishments and does not distinguish between full-time and part-time employees. Similarly, the SK&A data extract did not distinguish between part or full-time status and counted PCPs at the site level, which allows for

[8] Further information on the Business Register is available at: http://www.census.gov/econ/overview/mu0600.html.
[9] County Business Patterns Coverage and Methodology, available at: http://www.census.gov/econ/cbp/methodology.htm.
[10] Nonemployer statistics are available at: http://www.census.gov/econ/nonemployer/index.html.

counting the same PCP multiple times. Nevertheless, the information provided through both data sources aides in describing characteristics of primary care offices.

Section B: Primary Care Physicians.

This section presents estimates for the supply of primary care physicians (PCP) in Connecticut using data from the American Medical Association (AMA) Masterfile (2010) and applying a downward adjustment based on the National Ambulatory Medical Care Survey (NAMCS). The rationale for using the adjusted data from the AMA Masterfile is also described and compared to other existing data sources such as Connecticut physician licensing data (2008) and the Bureau of Labor Statistics (BLS) Occupational Employment Survey (OES) (2010).

Comparing Data Sources. Table 4 illustrates variation across the estimated number of primary care physicians (PCP) in Connecticut through Department of Public Health licensing data, the AMA Masterfile and Bureau of Labor Statistics Occupational Employment Survey (OES) data.

Table 4: Primary Care Physician Estimates by CT Data Source

DPH Licensing, with CT address (2008)	AMA Masterfile (2010)	AMA Masterfile (2010)	BLS OES (2010)
7,014	3,196 general	3,917 includes subspecialists	2,430

Licensing data identifies nearly 4,600 more primary care physicians (PCPs) than the labor data and nearly 3,100 more PCPs than the AMA Masterfile. Both the AMA Masterfile, and physician licensing data maintained by the Department of Public Health (DPH)[11] are censuses of license holders in the state.[12] However, current DPH licensing data does not adequately capture the extent to which a physician practices, the location of practice or demographics. Expanded profile information, including location of practice and demographic information is requested through the state's eLIcensing program. Unfortunately fewer than one-third of physicians currently renew online so this is not yet a reliable data source.[13]

The AMA Masterfile and BLS-OES estimates are closer but still differ by up to 1,500 PCPs when including subspecialists.[14] Primary discrepancies between the AMA Masterfile and the BLS-OES include the OES' use of the Standard Occupational Classification (SOC)[15] to list occupations, the definition of employee as part or full-time paid employee, and the exclusion of establishments (businesses) that do not submit unemployment insurance filings to the state.

[11] Public information from both databases is available electronically at the State of Connecticut eLicensing Website, https://www.elicense.ct.gov/.
[12] Eberly, M., and Benson, B., University of Connecticut, Center for Public Health and Health Policy (2008). Assessment of Primary Care Capacity in Connecticut, available at: http://publichealth.uconn.edu/images/reports/PrimaryCare_Report_02_17_09.pdf.
[13] Correspondence.
[14] If excluding subspecialists, the difference is 766.
[15] United States Department of Labor, Bureau of Labor Statistics, Standard Occupational Classification, 2010 SOC Major Groups, http://www.bls.gov/soc/major_groups.htm.

The range of estimates across data sources prompted additional investigation. The AMA Masterfile has been shown to over-identify the non-federal, office-based generalist physician workforce. Hing & Burt (2007) found that approximately 34% of the physicians in the 2003 National Ambulatory Medical Care Survey (NAMCS) sample, which used the AMA Masterfile as a sampling frame, were not actually non-federal, office-based generalist physicians. About twenty percent of them were misclassified, 9.5 percent of them had retired and 3.9 percent of them were otherwise ineligible for inclusion in this category.[16] The CPHHP applied the 34% "out-of-scope" adjustment from the NAMCS report to the AMA Masterfile data for CT PCPs. Using this adjustment, the number of PCPs (2,585 total or 2,109 without subspecialists) still differs from but approaches the BLS OES data. Although the two data sources group physicians differently, the similarity offers some credence to using an adjustment with the AMA Masterfile data. Using the NAMCS adjusted AMA Masterfile data also generates Connecticut estimates that are comparable to recent national level estimates of 47 PCPs per 100,000 residents using 2009-2010 NAMCS data.[17]

Nevertheless, the use of the 34% adjustment on the licensing data, as suggested by the NAMCS findings, should still be approached with caution. This adjustment was based on a comparison between a nationally representative survey and a national aggregation of AMA data. Because AMA relies on a high number and variety of sources, it may be that the real adjustment should vary considerably from state to state. Further, the out-of-scope portion of the adjustment may vary substantially from specialty to specialty.

Findings. Table 5 shows an estimated supply of 2,585 primary care physicians (PCPs) in Connecticut. The estimates are based on the 2010 AMA Masterfile data for office-based MDs and DOs practicing in family medicine and general practice, internal medicine, obstetrics and gynecology, and pediatrics. Of the PCPs, 476 identified as subspecialists. A recent informal inquiry using the Little Blue Book, a physician directory maintained by the private firm ShareCare, reported a supply of 507 family practice, 1,202 internal medicine and 754 pediatric physicians.[18]

Table 5: Supply of Office-based Primary Care Physicians in Connecticut, 2010

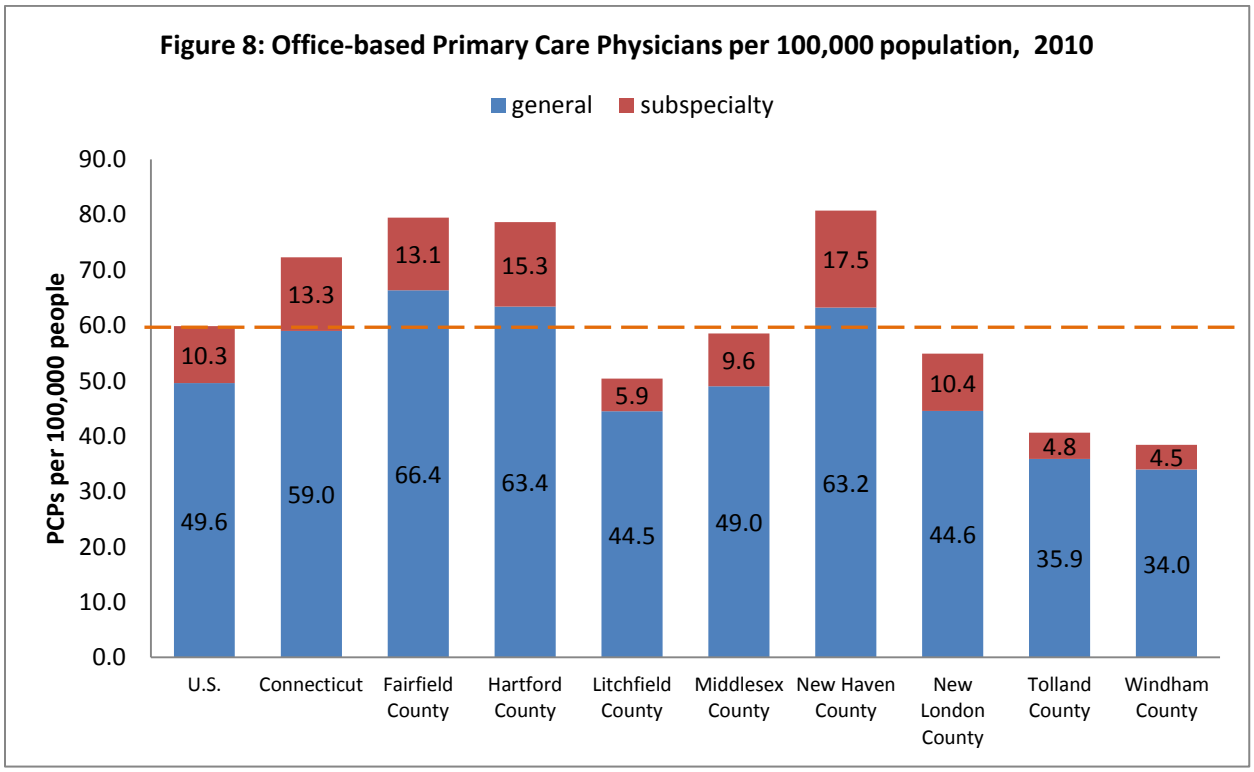
Specialty	General	subspecialists	Total
Family Medicine and General Practice	359	*xxx*	359
Internal Medicine	959	352	1,311
Obstetrics/Gynecology	325	30	354
Pediatric	467	94	560
Total	2,109	476	2,585

Source: AMA Masterfile (2010) accessed via Area Resource File 2011-2012. Adjusted using 34% reduction based on NAMCS.

Distribution of PCPs per population In 2010, the United States had an estimated 59.9 PCPs per 100,000 residents, of which 10.3 PCPs per 100,000 had a designated

[16] Hing & Burt (2007).
[17] Hing & Burt (2007).
[18] Reported 6/23/2013 by Dr. Jeff Howe from ProHealth at the Connecticut SIM Care Delivery Meeting 6/23/2013.

subspecialty (Figure 8). Connecticut exceeded the national PCP ratio, totaling 72.3 PCPs per 100,000. Despite Connecticut having a higher PCP to population ratio than the nation, five of the state's eight counties fell below the national PCP-population level. Provider-population ratios ranged from a low of 38.5 to a high of 80.8.



Sources: AMA Masterfile w/ NAMCS adjustment. Primary Care Physicians includes the sum of office-based general and family practice, internal medicine, obstetrics-gynecology and pediatric physicians.

Connecticut's most populated counties, Fairfield County (79.5), Hartford County (78.7) and New Haven County (80.7), rose above the national average and also the state's average for PCP to population supply. The state's least populated counties, Windham County (38.5), Tolland County (40.6) and Litchfield County (50.4) faced the lowest PCP ratios. Windham County and Tolland County also fell below the 47 office-based PCPs per 100,000 population reported through NAMCS for 2009-2010.

Data Sources. The U.S. Health Resources and Services Administration (HRSA) maintains the Area Resource File (ARF), a collection of health care workforce data from multiple sources, from which the AMA Masterfile (2010) was accessed. The American Medical Association's Physician Masterfile[19] is thought to provide a near census of United States physicians by specialty and practice setting and is recognized as being

[19] The AMA maintains an informational webpage about the Masterfile, here: http://www.ama-assn.org/ama/pub/about-ama/physician-data-resources/physician-masterfile.page.

the most complete list of American MDs and ODs.[20] As such, many academic and governmental organizations use its physician population counts, and accompanying data, to form the basis of workforce estimates and projections. HRSA relies upon the Masterfile for much of the occupational information contained in its publically accessible Area Resource Files (ARF).[21]

Not all of the information in the Masterfile is publicly available through the ARF. The data is available in preselected datasets that combine various types of data. For physicians, most of the data used in this scan captured active office-based practitioners not employed by the federal government. For a few of these categories, such as family and general physicians, information was available for both MDs and DOs. For several physician types such as subspecialties of Internal Medicine, only MD information was available.

The Masterfile is continually updated and includes data from medical schools, hospitals, state licensing agencies, state and national professional associations, and self-reports from individual practitioners.[22] The AMA also regularly surveys samples of individuals from its list. On average, each physician on the list is mailed a survey every three to four years.[23] Nonetheless, there is evidence that the Masterfile may over-report the number of physicians in a given area,[24] fail to note physician status changes from active to inactive for up to several years,[25] and misclassify the specialties or practice environments of physicians.[26]

[20] Staiger, D., Auerbach, D., and Buerhaus, P. (2009). Comparison of physician workforce estimates and supply projections. Journal of the American Medical Association, *302* (15), 1674-1680, available at: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2791886/.
[21] U.S. Department of Health and Human Services, Health Resources and Services Administration, Bureau of Health Professions, National Center for Health Workforce Analysis (2012). User documentation for the area resource file (ARF) 2011-2012 release, available (within a zip file containing the data) at: http://arf.hrsa.gov/purchase.htm.
[22] Rittenhouse, D., Mertz, E., Keane, D., and Grumbach, K. (2004). No exit: An evaluation of measures of physician attrition. HSR: Health Service Research *39*(5), 1571-1588, available at: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1361084/.
[23] Kletke (2004).
[24] Staiger et al. (2009).
[25] Rittenhouse, et al. (2004).
[26] Freed et al, (2006); Hing, E., and Burt, C., U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics (2007). Vital and Health Statistics, Series 13, no. 164, p. 2.

Section C: Other Health Professionals.

This section describes the supply of physicians' offices in Connecticut using a number of data sources, the 1) BLS Occupational Employment Survey (2012); 2) American Community Survey (ACS) Equal Employment Opportunity (EEO) Tabulation (2010); and 3) sources housed in the Human Resource Administration's Area Resource File, 2011-2012.

Findings. For most of the practice types of interest, there were at least two and at times three sources providing practitioner population estimates. As displayed in table 6 below, the estimates in some cases varied greatly. The ACS-EEO estimate for dentists was more than twice as much as the estimate produced by the OES. Other estimates were fairly similar. The population estimates for physician assistants produced by the ACS, the OES and the American Academy of Physician Assistance (available in the ARF) were fairly similar at 1,490, 1,675 and 1,497 respectively.

Table 6: Workforce Supply Estimates for Select Health Professionals in Connecticut

Health Profession	ARF, varies	ACS-EE0, 2010	BLS-OES, total 2012	BLS-OES, ambulatory care, 2012
Primary Care Physician Extenders				
Physician Assistant	1,497[a]	1,675	1,490	1,006
Registered Nurses	[c]	34,710	34,820	6,042
Advanced Practice Registered Nurse	2,571[b]	xxx	xxx	xxx
Nurse Practitioner	1,810[b]	960[d]	2,090	1,235
Licensed Nurses (LPN/LVN)	[c]	8,420	8,320	2,049
Medical Assistants	xxx	5,140	6,600	5,650
Behavioral Health Practitioners				
Psychiatrists	530[e]		780	xxx
Psychologists	1598[f]		1,970[g]	xxx
Mental Health Counselors	xxx		1,620	514
Substance Abuse & Behavioral Disorder Counselors	xxx		1,700	493
Healthcare Social Workers	xxx		2,370	514
Mental Health & Substance Abuse Social Workers	xxx		2,360	673
Dentist and Pharmacy Workforce				
Dentist	1,987[h]	2,610	1,020	xxx
Dental Hygienist	2,894[f]	2,345	3,760	xxx
Pharmacist	2,997	2,845	3,420	xxx

[a]American Academy of Physician Assistants (2010)—estimates of active physician assistants.
[b]Centers for Medicare and Medicaid 1/10/2011 National Provider Identification File.
[c] Census 2000 Special EEO Tabulation File 1. US Bureau of Census is 33,335 for RNs and 6,380 for LPN/LVNs.
[d]Category is Nurse Practitioners and Midwives
[e]AMA Masterfile, 2010: non-federal, office-based. Accessed via Area Resource File, 2011-2012.
[f]National Center for the Analysis of Healthcare Data, Edward via Virginia College of Osteopoathic Medicine, 2010. Data is from state licensure boards for those with current license residing within state of licensure.
[g]AMA Masterfile, 2010, non-federal office-based accessed via Area Resource File, 2011-2012.
[h]American Dental Association 2007 Distribution of Dentists in the United States by Region and State (2009)
xxx No estimate provided.

For most of the Connecticut health care practices examined, Connecticut has more practitioners per 100,000 people than the national average (Table 7). Connecticut has somewhat fewer dentists per person than the national average, at 28.4 per 100,000 compared to 29.8 per 100,000 nationally. This may be due in part, however, to the fact there are far more dental hygienists per 100,000 than then the national average, at 104.7 per 100,000 compared to only 60.6 per 100,000.

While Connecticut has a higher number of almost all identified health care providers per person than nationally, in particular there are substantially more physician extenders and related occupations per person in Connecticut than elsewhere. In addition to dental hygienists, there are high numbers of physician assistants, registered nurses, and medical assistants compared to national averages.

Table 7: Supply of Other Health Professionals per 100,000 people, Connecticut

Professions	Per 100,000 persons	
	Connecticut	U.S.
Dental and Pharmacy Professionals		
Dentist, general	28.4	29.8
Dental Hygienist	104.7	60.6
Pharmacist	95.2	89.7
PCP Extenders, ambulatory care settings		
Physician Assistant	28.0	18.0
Registered Nurse	168.3	145.6
Nurse Practitioner*	34.4	19.9
Licensed Nurse (LPN/LVN)	57.1	56.4
Medical Assistant	157.4	137.5
Behavioral Health		
Psychiatrist	10.1	3.6
Psychologist	54.9	7.6
Ambulatory care settings		
Mental Health Counselor	14.3	11.6
Mental Health & Substance Abuse Social Workers	18.7	10.0
Substance Abuse & Behavioral Disorder Counselor	13.7	7.4
Healthcare Social Workers	14.3	9.7

*It is unclear whether those who are nurse practitioners are also counted as registered nurses.
Calculated from U.S. Bureau of Labor Statistics, OES, May 2012.

Data is also collected at the MSA and non-MSA level. However, this information is not presented in this section due to suppressed data for a number of geographic levels. Even for the available data, it was unclear if available Census population estimates aligned correctly with the MSAs and non-MSA geography.

Data Sources.

U.S. Bureau of the Census, American Community Survey 2006-2010,[i] The American Community Survey (ACS) collects a wide range of information, including occupation information, from individuals across the country. The Equal Employment Opportunity (EEO) tables contain information on race, age, occupation, industry, educational attainment, earnings and employment status. Occupations are categorized based on the Standard Occupational Classification.[27] The ACS samples living quarter addresses taken from the Master Address File, which is maintained by the U.S. Census Bureau. The responses for five years are aggregated to produce the final ACS five-year dataset. The survey sample is stratified in several ways, which allows for county level estimates for Connecticut. Different administrations of the survey sample different levels of strata (national, state, local) and rely upon different sample sizes. The sample size for Connecticut ranged from a low of 28,019 in 2009 to a high of 32,858 in 2011.[28] Although the ACS collects occupation information at the individual level, the survey does not capture the practice setting. Therefore, ACS estimates capture practitioners working outside of ambulatory care, primary care and potentially the health care field.

U.S. Bureau of Labor Statistics, *Occupational Employment Survey (OES).* The OES survey is used to generate the State Occupational Employment and Wage Estimates and is carried out at the state-level. In Connecticut, the survey is administered semi-annually over 3 years, capturing approximately 18,000 establishments. Sampling weights are applied so that the panel data provides a rough representation of the universe of establishments. Information is collected at the industry and occupation level, as defined by the North American Industry Classification System (NAICS) and the SOC, respectively. A stratified probability sample of nonfarm establishments that file unemployment insurance (UI) reports to Connecticut's workforce agencies is used. Stratification criteria include geographic area (such as metropolitan statistical area, non-metropolitan statistical area or balance of state) and industry group. This allows for readily available workforce estimates at the metropolitan and non-metropolitan statistical area rather than the county-level.

Self-employed, owners and partners in unincorporated firms, household workers, and unpaid family workers are not included in the OES. Any health professionals working outside of establishments that file UI reports are not captured. On the other hand, employees are defined as all part-time and full-time workers who are paid a wage or salary while establishments are defined as a physical location where economic transactions occur. [29] This lack of differentiation between full and part-time employees likely biases workforce capacity estimates upwards. For example, an employee working in several establishments may be reported multiple times as an employee.

[27] More information on the EEO Tabulation 2006-2010 is available at: http://www.census.gov/people/eeotabulation/

[28] More information on the methodology of the ACS is available here: http://www.census.gov/acs/www/methodology/methodology_main/.

[29] "Bureau of Labor Statistics, U.S. Department of Labor, Occupational Employment Statistics. www.bls.gov/oes/.

The following sources of health workforce data were accessed through HRSA's Area Resource file:

- American Academy of Physician Assistants Survey (2010)
- Centers for Medicare and Medicaid 1/10/2011 National Provider Identification File
- Census 2000 Special EEO Tabulation File 1
- AMA Masterfile, 2010
- National Center for the Analysis of Healthcare Data, Edward Virginia College of Osteopathic Medicine, 2010
- American Dental Association 2007 Distribution of Dentists in the United States by Region and State (2009)

Section D: Provider Demographics.

Findings. The readily available demographic data about Connecticut health care practitioners includes proportion of practitioners who have attained a specified age threshold (either 60 or 65), gender, and race. An aggregation of the available data is shown in Tables 8 through 10, below. The data available for PCP extenders such as physician assistants and nurses and behavioral health practitioners is not limited to those employed in primary care. It is possible that health professionals electing into primary care may differ somewhat in demographics.

Age. The data sources for Table 8 draw from the Connecticut Department of Public Health's (DPH) *Statewide Health Care Facilities and Services Plan* and the AMA Masterfile. In the DPH report, age estimates are based on professional license holders. The report supplies average age of practitioner and proportion of the practitioners who have attained the age of 60 years. In a report issued in 2008, the CPHHP suggested that the number of active licenses overestimates the number of practitioners actively practicing. This difference may be due to, among other things, retirements. If so, a smaller proportion of active practitioners may have attained the age of 60 than reflected in table 8.

Table 8. Percent of health practitioners over age 60 or 65.

Critical Health Care Workforce Role	2012,% over 60[1]	% over 65[2]
Physicians and Surgeons	27.0%	
MD (2010)	*	21.3%
DO (2010)	*	4.2%
Family and General Practitioners (2010)	*	9.1%
Internal Medicine (2010)	*	10.2%
Obstetrics and Gynecology (2010)	*	8.5%
Pediatrics (2010)	*	11.7%
Physician Assistant	7.0%	*
Registered Nurse	22.0%	*
Licensed Nurse	24.0%	*
Advanced Practice Registered Nurse	19.0%	*
Psychiatrist (2010)	*	24.6%
Psychologists	35.0%	*
Alcohol and Drug Counselor	29.0%	*
Mental Health Counselor	33.0%	*
Dentist (2007)	*	14.7%
Dental Hygienist	11.0%	*
Pharmacist	*	*

[1]Statewide Health Care Facilities and Services Plan, Appendix D, p. 160-161 (Conn. professional licensure data).
[2]Area Resource File (2011-2012), Human Services and Resources Administration, U.S. Department of Health and Human Services.
* not available in the reviewed reports.

Demographic estimates for age by physician specialty came primarily from the AMA *Masterfile*, accessed through ARF. The distinction between active and inactive practitioners or practice setting (e.g., office-based, hospital-based) was not available when examining age by specialty. The age data reported includes all nonfederal practitioners in the given specialty category. To the extent that inactive practitioners are more likely to be over 65, there may be an upward bias to the estimate.

The license data suggests that for many health profession license types, more than one out of five licensees have reached the age of 60 years. Psychologists have the highest proportion of licensees 60 or older, at 35 percent. The only exceptions are Dental Hygienists and Physician Assistants, with only eleven and seven percent of their number over the age of 60. Roughly 27% of holders of the physician and surgeon license are 60 or older.

Other sources suggest, however, that many of these license holders may have already left the practice covered by their license, through retirement or otherwise. The AMA Masterfile's data on physicians from 2010, available through the ARF, lists proportions of about 10% age 65 or older for each of the physician specialties of interest here. Unlike the licensing data, the AMA Masterfile makes some attempt to account for retirements, and the lower numbers may reflect this. The AMA has itself been criticized for the slowness with which it incorporates retirement information, and, therefore, the actual proportion of physicians and psychiatrists over age 65 may be even lower than indicated.

Gender. Several practitioner types disproportionately employ one gender (Table 9). For example, Registered Nurses are 93.7 percent female, Dental Hygienists are 98.6 percent female. More than 80 percent of dentists, on the other hand, are male. Other occupations are more evenly split between male and female. Forty-seven percent of pediatric physicians are male, and 52.9% female, for example.

The data shown for MDs and DOs originates from the ARF and is limited to total holders, rather than physician specialty. In light of the findings from the 2009 Primary Care Survey, the potential for significant differences by specialty is plausible. For example, the Connecticut survey found females to be the majority (52.9%) of pediatric physicians.

Table 9. Health Practitioners and Gender		
Critical Health Care Workforce Role	Male%	Female%
Physician and Surgeon (2010)[1]	63.7%	36.3%
MD (2010)[2]	68.2%	31.8%
DO (2010)[2]	62.0%	38.0%
Family Medicine and General Practice (2009)[3]	63.8%	36.2%
Internal Medicine (2009)[3]	63.3%	36.7%
Obstetrics and Gynecology	NA	NA
Pediatrics (2009)[3]	47.1%	52.9%
Physician Assistant (2010)[2]	31.9%	67.8%
Registered Nurse (2010)[1]	7.5%	92.5%
Licensed Nurse (2010)[1]	8.5%	91.5%
Nurse Practitioner	NA	NA
Psychiatrist	NA	NA
Psychologists (2010)[1]	32.4%	67.5%
Alcohol and Drug Counselor*	*	*
Mental Health Counselor (2010)	30.8%	69.2%
Dentist (2007)[2]	83.7%	16.3%
Dental Hygienist (2010)[1]	4.3%	95.9%
Pharmacist (2010)[1]	49.0%	51.0%

[1]American Community Survey 2006-2010, Equal Employment Opportunity Tables.
[2]Area Resource File (2011-2012), Human Services and Resources Administration, U.S. Department of Health and Human Services.
[3]Aseltine, R., Katz, N., and Geragosian, A. Connecticut 2009 Primary Care Survey: Physician Satisfaction, Physician supply and Patient Access to Medical Care. Connecticut Medicine, 2010; 74(5): 281-291, available at: https://www.csms.org/upload/files/Primary%20Care%20survey/Connecticut%20Medicine%20-%20CSMS%20Primary%20Care%20Survey%20Report.pdf.
* The ACS-EEO 2006-2010 tables aggregate data on: Substance Abuse and Behavioral Disorders; Educational, Guidance, School and Vocational; Marriage and Family Therapists; Rehabilitation; and all other Counselors into a single listing, "Counselors."

Race. Most of the data on race listed in Table 10 derives from the American Community Survey. The race data is available for several more discrete categories than reported in the table. Several categories have been collapsed into "other," due to low rates of incidence.

Table 10. Health Practitioners and Race					
Critical Health Care Workforce Role	White	Black	Asian	Hispanic	Other
Physician and Surgeons (2010)[1]	71.8%	4.9%	17.0%	5.0%	1.2%
Family Medicine and General Practice (2009)	85.3%	1.5%	9.6%	3.7%	**
Internal Medicine (2009)	83.6%	1.7%	13.8%	0.9%	**
Obstetrics and Gynecology	NA	NA	NA	NA	NA
Pediatrics (2009)	86.4%	2.6%	7.8%	3.2%	**
Physician Assistant (2010)	73.7%	7.2%	6.9%	11.4%	.9%
Registered Nurse (2010)	82.3%	7.8%	5.3%	3.5%	1.0%
Licensed Nurse (2010)	68.1%	23.3%	1.8%	5.1%	1.6%
Nurse Practitioner	NA	NA	NA	NA	NA
Psychiatrist	NA	NA	NA	NA	NA
Psychologists (2010)	90.8%	2.1%	0.8%	4.9%	1.4%
Mental Health Counselor (2010)*	68.4%	18.6%	1.2%	7.5%	2.2%
Dentist (2010)	75.3%	3.3%	10.2%	7.5%	3.7%
Dental Hygienist (2010)	88.3%	2.6%	0.0%	7.9%	1.4%
Pharmacist (2010)	77.0%	2.1%	16.7%	2.9%	.9%

[1]American Community Survey 2006-2010, Equal Employment Opportunity Tables, U.S. Census Bureau.

* The ACS-EEO tables aggregate data on: Substance Abuse and Behavioral Disorders; Educational, Guidance, School and Vocational; Marriage and Family Therapists; Rehabilitation; and all other Counselors into a single listing "Counselors".

**The 2009 survey lists all of its respondents as being either White, Black, Asian or Hispanic.

A majority of most of the practitioner types reviewed self-identify as being White. Practitioners who self-identify as Black; Asian; Hispanic; or some other race, combination of races or no race at all, tend to supply 10% or less of the workforce for any given practitioner type. The most noticeable exceptions to this are Licensed Nurses, 23.3 percent of whom are Black; Counselors, 18.6 percent of whom are Black; and Pharmacists, 16.7 percent of whom are Asian.

Limitations. Most of the data in the tables had only one source, precluding a quick comparison of multiple sources. However, the limited comparisons available suggest that the demographic data should be relied upon with caution. In two instances, however, there were two independent sources attempting to estimate the same type of information. Dentists' ages are provided in both the ARF and the DPH licensing records. The ARF, which is based on a 2007 survey of dentists, estimates the proportion of dentists over the age of 65 to be 14.67%, whereas the proportion of dentist licensees in DPH's database over the age of 60 is 29%. This fairly substantial difference is likely only partially accounted for by the differing age thresholds in the respective reports. The other piece of data with two independent sources is the age of registered nurses. In this case, the age threshold for both is 60 years. The HRSA report estimated that 18.7% of registered nurses in Connecticut were age 60 or more in 2008. The number of registered nurse licensees over the age of 60 in 2012 was 22%.

While the percentage difference is close here, the base for registered nurses is more than 33,000, so the difference in estimates is nearly 1,500 nurses.

Data Sources. CPHHP identified a number of existing reports estimating various aspects of Connecticut's health care workforce during the course of this scan. CPHHP also examined several datasets, those relied upon within the reports and others subsequently identified, that contain data relevant to Connecticut's health care workforce. Of the reports reviewed, the following contain information about health care practitioner's demographic descriptions:

- Statewide Health Care Facilities and Services Plan (October 2012). Prepared by the Office of Health Care Access, Connecticut Department of Public Health.

- The Registered Nurse Population: Findings from the 2008 National Sample Survey of Registered Nurses (September 2010). Prepared by the Health Resources and Services Administration, U.S. Department of Health and Human Services.

- Connecticut 2009 Primary Care Survey: Physician Satisfaction, Physician Supply and Patient Access to Medical Care (May 2010). Robert H. Aseltine, Jr., Matthew C. Katz, and Audrey Honig Geragosian. Connecticut Medicine, *74*(5), 281-291.

- Oral Health in Connecticut (2007). Prepared by the Office of Oral Health, Connecticut Department of Public Health.

The key data sources for the above reports included health practitioner licensing data from the Connecticut Department of Health,[ii] the Connecticut 2009 Primary Care Survey conducted by the Connecticut State Medical Society, [iii] and the HRSA Area Resource File (ARF). [iv] The Connecticut 2009 Primary Care Survey, surveyed members of the Connecticut Chapter of the American Academy of Pediatrics, the Connecticut Chapter of the American College of Physicians, and the Connecticut Academy of Family Physicians.

ARF was used to access four different data sources on a variety of health professions, including:

- American Medical Association (AMA) *Masterfile (2010)*
- Census 2000 Equal Employment Opportunity Tables, U.S. Bureau of the Census[v]
- American Dental Association *2007 Distribution of Dentists in the United States by Region and State (2009)*, for dentists' gender and age
- National Sample Survey of Registered Nurses (2008)

Most of the demographic data for occupations other than physicians was taken from estimates based on the U.S. Bureau of the Census, American Community Survey

(ACS) 2006-2010 Equal Employment Opportunity (EEO) tables. The ACS collects a wide range of information, including occupation information, from individuals across the country. The EEO tables contain information on race, age, occupation, industry, educational attainment, earnings and employment status. Occupations are categorized based on the Standard Occupational Classification.[30]

The ACS samples living quarter addresses taken from the Master Address File, which is maintained by the U.S. Census Bureau. The responses for five years are aggregated to produce the final ACS five-year dataset. The first such dataset coves the years 2006-2010. The survey sample is stratified in several ways, which allows for county level estimates for Connecticut. Different administrations of the survey sample different levels of strata (national, state, local) and rely upon different sample sizes. The sample size for Connecticut ranged from a low of 28,019 in 2009 to a high of 32,858 in 2011.[31] Although the ACS collects occupation information at the individual level, the survey does not capture the practice setting. Therefore, ACS estimates capture practitioners working outside of ambulatory care, primary care and potentially the health care field.

[30] More information on the EEC Tabulation 2006-2010 is available at: http://www.census.gov/people/eeotabulation/
[31] More information on the Methodology of the ACS is available here: http://www.census.gov/acs/www/methodology/methodology_main/

Conclusion

The ability to assess the health care workforce in Connecticut is constrained by inadequacies in the existing data collected. A paramount issue is that using different data sources can yield varying estimates of workforce supply and related characteristics. The following are important considerations about existing data.

1. Practitioner population estimates are difficult because no one data source is current and provides practice specialty, employment setting, hours worked, and county-level data.

2. Data sources do not consistently group occupations, practice setting types, or substate regions, and some do not provide reliable subnational estimates.

3. AMA Masterfile, the basis of many national workforce studies, may overestimate the number of active office base primary care physicians by as much as one-third.

Continued efforts are needed to improve the quality of health care workforce assessments in Connecticut. Such efforts may include **a)** primary data collection on its own or to assess the quality of existing data sources; **b)** requiring completion of physician and nurse profiles at the time of license renewal; **c)** expanding and implementing profile collection for additional health professions at the time of license renewal; and **d)** exploring the usefulness of proprietary marketing data sources such as D&B and SK&G. In addition, the National Ambulatory Medical Care Survey changed its sample design and will be releasing state-level estimates in the summer of 2013. These estimates should provide a reliable source of information on state-wide primary care physician supply in the short-term.

Even in light of the data challenges, the scan conducted provides some insight on the primary care workforce. These key findings are listed below.

- There are more practitioners per person in Connecticut for nearly all identified professions than the United States average, but particularly for Physician Assistants, Medical Assistants, and Dental Hygienists. However, several Connecticut counties fall below the national average for primary care physicians.

- Connecticut's three most populous counties, Hartford, New Haven, and Fairfield, have the most ambulatory centers per person and the most primary care physicians per person in the state. The two least populous counties have the fewest ambulatory centers per person and the fewest primary care practitioners per person in the state.

- Connecticut has 7.6 physicians' offices and 1 outpatient care center per 10,000 people in the state.

- Connecticut physicians' offices tended to be small, with fewer than 10 employees (68%). A minority of physicians' offices, 13%, employed a staff of 20 or more.

- More than half of PCPs worked at small practice sites with three or fewer PCPs.

- About four out of five sites (family practice, internal medicine and pediatrics) employed three or fewer PCPs.

- Practitioners who self-identify as Black; Asian; Hispanic; or some other race, combination of races or no race at all, tend to supply 10% or less of the workforce for any given practitioner type.

Appendix I.

Table II.1 Distribution of Ambulatory Care Establishments in Connecticut, by County					
Region	Population	Employment	Offices	Employment per office	Offices per 10,000 people
Connecticut	3590347	85594	6900	12.4	19.2
Fairfield	933835	23529	1999	11.8	21.4
Hartford	897259	25882	1869	13.9	20.8
Litchfield	187530	2667	339	7.9	18.1
Middlesex	165602	4037	283	14.3	17.1
New Haven	862813	20879	1606	13.0	18.6
New London	274170	5099	454	11.2	16.6
Tolland	151539	1710	201	8.5	13.3
Windham	117599	1316	141	9.3	12.0

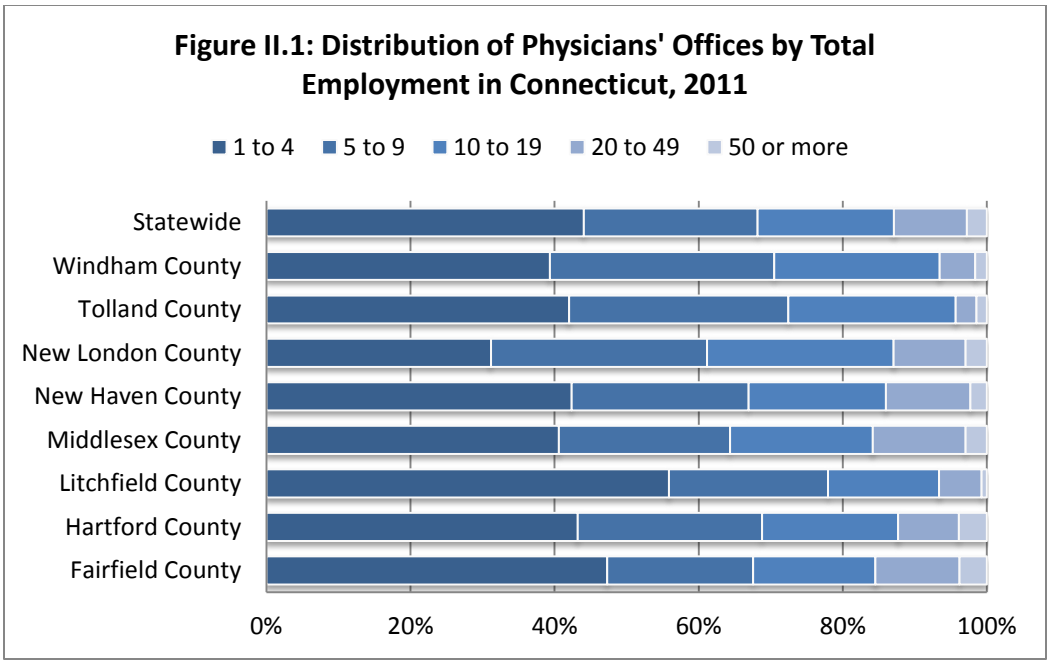
Source: U.S. Census Business County Patterns, 2011.

Table II.2: Distribution of Physicians' Offices in Connecticut, by County (2011)					
Region	Population	Employment	Offices	Employment per office	Offices per 10,000 people
Connecticut	3590347	29665	2744	10.8	7.6
Fairfield	933835	9524	814	11.7	10.2
Hartford	897259	8181	737	11.1	8.2
Litchfield	187530	944	136	6.9	7.3
Middlesex	165602	1142	101	11.3	6.1
New Haven	862813	6938	656	10.6	7.6
New London	274170	1862	170	11.0	6.2
Tolland	151539	554	69	8.0	4.6
Windham	117599	520	61	8.5	5.2

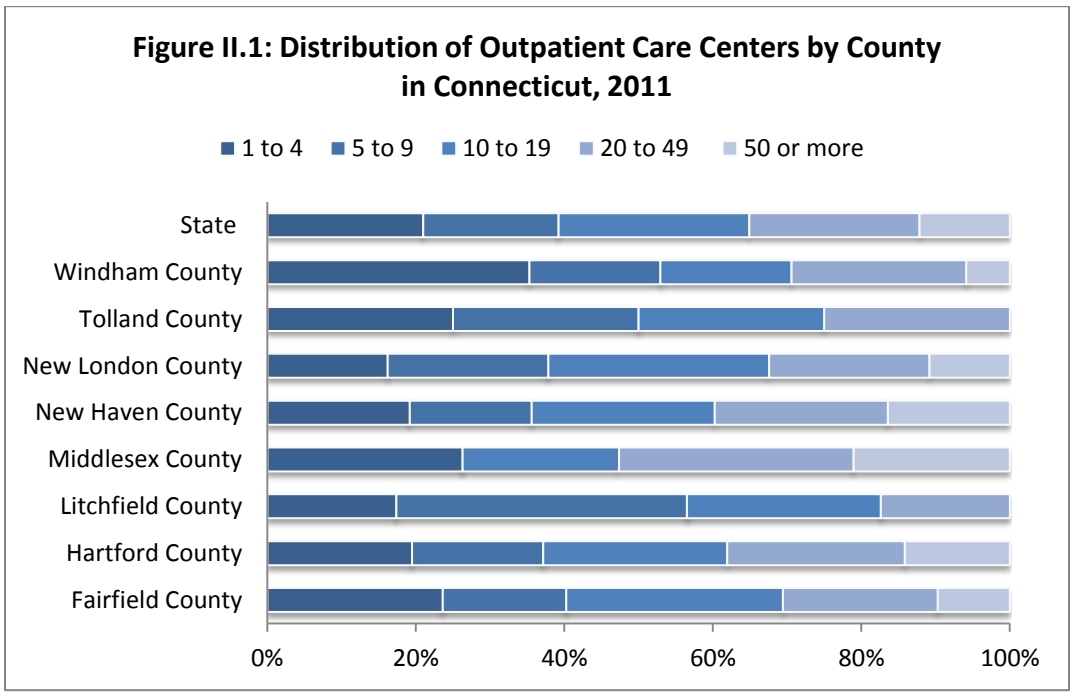
Source: U.S. Census Business County Patterns, 2011.

Table II.3: Distribution of Outpatient Care Centers in Connecticut, by County (2011)					
Region	Population	Employment	Offices	Employment per office	Centers per 10,000 people
Connecticut	3590347	9306	362	25.7	1.0
Fairfield	933835	1499	72	20.8	0.8
Hartford	897259	3186	113	28.2	1.3
Litchfield	187530	100<249	23	4.3<10.8	1.2
Middlesex	165602	816	19	43.0	1.2
New Haven	862813	2475	73	33.9	0.9
New London	274170	726	37	19.6	1.4
Tolland	151539	20<100	8	2.5<12.4	0.5
Windham	117599	273	17	16.1	1.5

Source: U.S. Census Business County Patterns, 2011.



Source: U.S. Census Business County Patterns, 2011.



Source: U.S. Census Business County Patterns, 2011.

[i] The ACS data base may be searched here:
http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t

[ii] The publically available portion of the Health Practitioner Licensure Database is available at:
https://www.elicense.ct.gov/

[iii] The Area Resource File is available at: http://arf.hrsa.gov/. Note: In June, 2013, the Area Resource File was renamed the Area Health Resource File and the 2012-2013 update was released. This data was released too late to be included in this report.

[iv] The Area Resource File is available at: http://arf.hrsa.gov/. Note: In June, 2013, the Area Resource File was renamed the Area Health Resource File and the 2012-2013 update was released. This data was released too late to be included in this report.

[v] The Census 2000 EEO Tables are available at: http://www.census.gov/eeo2000/